SECTION UC-610

PUMP STATION CONTROL PANEL

PART 1 - GENERAL

1.01 SCOPE OF WORK

The Contractor shall furnish and install an aboveground pump station control panel, which shall include the level indicator, pump alternators, motor controllers, breakers, relays, switches, lamps, and all electrical material specified herein or required for a complete installation.

1.02 RELATED SECTION

Section UC-600 - Pump Station Electrical Material

1.03 QUALITY ASSURANCE

A. All electrical materials and equipment shall be new, of recent domestic manufacture, and approved by the Underwriters' Laboratories, Inc. Material or equipment damaged in the course of installation or test shall be replaced or repaired in a manner meeting with the approval of the Engineer (ie the Chief, Engineering Division, MD-WASD or his representative). Further, said repairs or replacement shall be performed by personnel qualified such that the UL approval will not be lost. The Contractor shall provide satisfactory evidence of these qualifications to the MD-WASD prior to the work being performed.

B. All electrical material and installation shall comply with the codes and standards listed in Section UC-600.

1.04 SUBMITTALS

The Contractor shall provide all submittals in accordance with Section UC-600, Subsection 1.04.

PART 2 - PRODUCTS

2.01 GENERAL

A. The Control Panel shall be designed and built as integrated, pre-wired equipment. It shall control the operation of two pumps, based on the level in the wet well.

1. Bubbler level controller (specified in Section UC-615) shall monitor the wet well level and actuate the sewage pumps in sequence with rising water level. Once a pumping cycle has started, it shall continue until the stop level is reached. All start/stop levels shall be adjustable, based on design levels shown on the Plans. Controller shall maintain level to within ± 1% of full scale (ie maximum depth).

2. The seal water pumps, when required, shall follow the sewage pumps, an alternator shall automatically change the sequence of the pumps after each cycle of operation.

A three position selector switch shall be provided for manual selection of pumps sequence. An alarm shall be annunciated whenever the lag pump is called on, indicating failure of lead pump. Signals to operate the pumps shall come from an adjustable pressure switch.

B. The Panel shall include the level indicator and pump alternators, motor controllers, breakers, relays, switches, lamps, pressure switches and any other device shown on the Plans, or required to function as specified. Shop drawings of every device shall be submitted and approved before the panel is assembled.

1. Phase monitor relay shall be Timemark Model 258, Potter-Brunfield CPS-38, or approved equal, fused on line side and disconnect only for 3 phase equipment.

2. Selector switch to manually select or automatically alternate position of "lead" and "lag", sewage and seal water pumps after each pumping cycle shall be furnished and installed. Alternator relay shall be Timemark 261DX, Struthers Dunn A 311 BPR, or approved equal. Failure of any pump shall initiate alarm.

C. The manufacturer of the control system shall be certified by the Underwriters Laboratories (UL) as a UL 508 listed system panel manufacturer certified to install serialized label for quality control and insurance liability considerations.

D. Each major component shall be identified by an engraved phenolic nameplate.

E. All wiring shall be a flexible, stranded type and each conductor shall be tagged and numbered according to wiring diagrams and neatly tied.

F. The Control Panel shall be dimensioned to facilitate maintenance. Enclosure shall be as specified in Subsection 2.06, herein.

2.02 MISCELLANEOUS EQUIPMENT

A. Pressure switches shall be Square D class 9012, Allen Bradley series 836, or approved equal.

B. Circuit breakers shall be thermal magnetic, molded case, Square D, type FA, or approved equal.

2.03 ALARMS

Control panels shall be capable of reporting, a minimum, of the following alarm points:

A. Dry Well High Level (Float switch)

B. Wet Well High Level

C. Wet Well Low Level (With auxiliary contact to stop sewage pumps.)

D. Level Controller Failure

E. Seal Water Pumps Failure

F. Sewage Pump High Temperature or Failure (with pump shut down, lock out relay and reset push button.)

G. Loss of Phase Voltage

H. Sump Flood (Dry well only)

I. Provide three spare alarm points and one set of N.O./N.C. contacts from common alarm relay for remote signalling. Every alarm shall be indicated by a labeled red pilot light mounted in the control panel. A red light with guard protector, as Series VDA manufactured by Crouse-Hinds, or approved equal and a bell with silencing buttons shall be mounted in the service enclosure. The alarm lights shall remain "on" until alarm signal is reset at control panel.

2.04 MOTOR CONTROLLERS

Motor controllers shall be sized as indicated on the drawings, with overloads to match the supplied motors. One set of N.O/N.C. spare contacts shall be provided in the sewage pump starter. Motor controllers to be Square D, Cutler Hammer, or equal.

A. Starters for sewage pumps shall be three-phase, sized in accordance with the following table:

MOTOR SIZE	NEMA SIZE STARTER		
(Horsepower)	SINGLE PHASE	THREE PHASE	
	240 Volt	240 Volt	480 Volt
Up to 5	2	1	1
7½	2	2	1
10	-	2	2
15	-	3	2
20	-	-	2
25	-	-	3
30	-	-	3
40	-	-	3
50 to 75	-	-	4
100 to 150	-	-	5

Note: seal water starters are single phase, 2 pole size 00 or size 0 from 1 hp to 2 hp.

B. All wiring shall be a flexible, stranded type and each conductor shall be tagged and numbered according to wiring diagrams and neatly tied.

C. All external wiring shall terminate in a terminal block, Square D type G class 9080, or equal.

D. Relays shall be socket-mounted for ease of replacement, Square D type K Class 8501, or equal.

E. Lamps, push bottoms, and switches shall be heavy duty oil-tight/watertight, Square D, type K Class 9001, or equal.

F. Elapsed time meters shall be provided to indicate total running time of each sewage pump in "hours" and "tenths of hours". Meters shall be Eagle Signal Series HK or approved equal. An extra elapse time meter shall be furnished and installed to indicate the total time for all pumps simultaneous run.

2.05 BUBBLER LEVELER CONTROLLER

As specified in Specification Section UC-615

2.06 TELEMETRY

Telemetry (RTU) provided by the MD-WASD shall be installed by the Contractor in a designated space, measuring approximately 30" X 30", inside the enclosure. The manufacturer of the control system shall provide the hardware to interface the controller with the MSWASD SCADA System to remotely start-stop the pumps and monitor the operation of pumps and alarms

2.07 SERVICE ENCLOSURE (or Control Panel)

A. The enclosure shall be gasketed, NEMA 3R, free standing, stainless steel, 12 gauge minimum construction, with same material continuous hinges and dead front anodized aluminum inner door. Finishing of the enclosure to be No. 2B. Padlocking of motors circuit breakers shall not obstruct the closing of the inner doors. Inside panels shall be NEMA 12, constructed of .080 inches thick anodized aluminum or 14 gauge 316 stainless steel. Control wiring shall be color coded (minimum of 16 different colors), 16 gauge, 600 volts, 90 degree C. standard tinned copper, PVC insulated with crimped terminal connections.

B. Enclosure shall be approximately 60" W x 48" H x 12" D. In any case, it shall be sized to facilitate maintenance of enclosed equipment. Total length of the enclosure will depend on the size of the pumps but shall be sized to provide enough space so that every piece of equipment can be easily reached for service and maintenance. The outer doors shall be furnished with a locking latch and staple for padlock, to be furnished by the MD-WASD. All hardware shall be stainless steel. Provide every outer door with a limit switch to trip a remote alarm in case of unauthorized opening. Panel seams shall be continuously welded and ground smooth. All exterior joints shall be ground level and polished smooth. Stiffeners shall be added to panel sides and doors as necessary to ensure rigidity. Lifting eyes and a rolled lip around three sides of the outside doors shall be provided. Provide also a rain shield over the generator outlet or access opening. Enclosure shall be 12-inches deep minimum.

C. The door shall be made of the same material as the cabinet. All edges of the door shall be folded inward, similar to the cabinet to form a rigid non-flexing door. The door shall be hung on a continuous stainless steel hinge with stainless steel bolts and nuts. The door shall be equipped with a three-point locking latch, a handle and a heavy-duty stainless steel staple for a padlock.

D. Cabinet anchorage shall consist of chemical adhesive anchor cartridge system 5/8" φ, minimum, stainless steel anchor threaded rod with 5-1/2" ,minimum, depth of embedment. The cabinet shall be secured to the concrete base at a minimum of four locations.

E. An alarm flashing light shall be furnished and mounted on top of the enclosure and shall be activated for any major problem in the station. The flashing light shall be incandescent, 60 watts minimum, vapor-tight, aluminum body with guard.

F. The alarm bell shall be 120 volt A.C., 6 inches diameter, 90 db, weatherproof with protecting guard. Bell shall be Simplex Series 4090 or approved equal.

G. A cast or stamped plate, with the legend "Miami-Dade Water and Sewer Department, Tel. (305) 274-9272" in characters a minimum of 2-inches high, shall be firmly attached to the upper portion of the door by welding or tamper-proof bolting.

PART 3 - EXECUTION

3.01 EXAMINATION & INSTALLATION

A. Verify items provided by other sections of Work are properly sized and located.

B. Verify that built-in items are in proper location, and ready for roughing into Work.

C. The Contractor shall provide limit switch to turn light "ON" when dry well hatch is opened.

D. Minimum interrupting capacity of the electrical panel shall be 14,000 AMPS.

E. Sump pump shall be provided with high level alarm wired to the telemetry.

F. Main Disconnect switch shall be sized to match main circuit breaker and in a pad lockable NEMA 3R stainless steel enclosure.

G. Control panel shall incorporate a Tamper/Intrusion Switch (DC) that activates an alarm to the RTU whenever the panel is opened. Control panel shall be located outside of pump station at ground level

H. When field conditions requires that meter to be mounted at a location more than five (5) feet away from the Main Breaker of the Control Panel, a service entrance rated enclosed main circuit breaker shall be provided . It shall be mounted not more than five (5) feet away from the meter location.

I. A sump pump, discharge piping and local switch shall be installed in the valve pit in accordance with Section UC-600, Subsection 3.03-B.

3.02 CERTIFICATIONS

At the time of final acceptance inspection, and in addition to all other submittals required by the specifications, the Contractor shall furnish the following:

B. Submit letter from the electrical panel manufacturer certifying that:

1. The electrical panel has been inspected at the jobsite after complete installation.

2. The electrical panel and its components match approved shop drawings and are in compliance with the project's plans and specifications.

3. The electrical panel and its components have not been modified, changed or altered in any way which will void the Underwriter Laboratory "UL" listing.

4. The electrical panel and its components are safe to energize and operate.

B. Submit letter from the Contractor certifying that:

1. The electrical panel has been installed in accordance with the MD-WASD's standards and these specifications.

2. External wiring has been terminated inside the panel at the ddesignated "Terminal Boxes", in accordance with the approved electrical schematic and/or shop drawings.

3. The electrical panel and its components have not been modified, changed or altered in any way which will void the Underwriter Laboratory "UL" listing.

4. The electrical panel and its components matcdh approved shop drawings and are in compliance with the MD-WASD's specifications.

5. The electrical wiring schematic and control schematic are current and reflect all field modifications made, if any.

6. The electrical panel and associated electrical equipment are safe to energize and operate.

END OF SECTION